

Multi-Criteria Decision Analysis - UFA

Utility function approach for analyzing Multi-Objective problems and for Strategies ranking

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Overview of the features

Multi-Criteria Decision Analysis (MCDA). The library UFA.dll contains classes for processing and analyzing Multi-Criteria Decision problems. The library collaborates with MCDA.dll library – the MCDA.dll library contains classes generally applicable for MCDA Tasks. Further support is provided by MCDAJson.dll and JsonFormatting.dll libraries. The Json-formed data enable sharing data in a uniform format with other (MCDA-oriented and others) applications, but also readability similar to xml data.

The UFA.dll and MCDA.dll libraries support some generalization of UFA method, e.g. the worst-best pair of values may be specified by the user for ratings by each criterion. The utility function may define utilities in the customary $< 0 ; 1 >$ interval but other utility values are also admissible. That way, the utility function may eventually assign negative partial utility to a criterion value that lessens the overall utility. A zero-unit value specifies for each criterion the 0 and 1 partial utility of that criterion. While usual piecewise linear utility function class is part of the library, users may create their custom classes implementing the appropriate interface.

A sample Windows application demonstrates the libraries usage. The application reads sample data stored in Json format. The sample data serve as instruction for user data preparation at the same time. The output, results of analyses (calculations), once again Json formatted, will be displayed by the application, and/or can be saved to a file. This makes the sample application able to directly analyze user data/tasks.

The classes in the libraries are documented in xml C# standard way. The Json format and semantics for MCDA tasks is designed to allow data in a single file (or a batch) to be used for UFA method as well as for other MCDA methods.

The sample application presents information and tips for further software development, either by extending classes or creating end-user applications.

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